University of Colorado at Boulder
Department of Economics

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ECON 8848: Applied Microeconometrics, Fall 2025
Syllabus and Schedule
Office Hours: TTh 1:30-3:00 PM
Economics 208D

Course Description:

Students who are successful in this course will be well-prepared to conduct empirical research across a broad range of fields, although the causal inference tools we discuss are used most frequently in the applied microeconomics fields. The course provides a "user's guide" to many common econometric techniques, with a heavy focus on implementation and interpretation. We will begin the course with a STATA boot camp, quickly becoming familiar with the software package including programming techniques and data management skills. We will then move through a range of econometric topics, making sure to practice each technique in STATA.

Prerequisites:

To enroll in this course, you must have a working knowledge of statistics and econometrics equivalent to that obtained in ECON 7818 and ECON 7828.

Course Materials:

There is no required textbook for this course, although I will provide references to multiple books and articles for the interested student. We will also read and discuss a couple of articles. Some of these articles will be "theory" articles, discussing the relative merits of estimators or developing and applying new ones. Others will be "application" papers, usually papers that use a technique we have discussed in an honest and useful way. I will also provide slides and lecture notes, and you will find these and the assigned articles posted or linked on the Canvas website. You should read the articles assigned prior to coming to class and be prepared to answer questions and participate in discussions. Please bring a copy (paper or electronic) of the papers we are discussing with you to class.

Students are not required to purchase their own copies of Stata, although those desiring to do so qualify for a substantial student discount. More information is available through a link posted on the Canvas website. You may complete all of the exercises for this class using Stata/BE, although you may prefer to purchase a more powerful "flavor" (SE or MP) if you intend to use Stata for your work beyond this course.

I will use Stata during some lectures to demonstrate methods that we cover. If you have Stata installed on your computer, you may find it useful to have it open on those days, but I will provide the code through the course website for review after class.

Requirements and Grading:

Your grade will depend on your performance on the assignments listed below:

Assignment	Weight	Due Date
Problem Sets	15%	Every 1-2 weeks (8-10 total)
Paper Replication/Extension	30%	Thursday 12/11 1:00 PM (Final exam slot)
First Midterm	25%	Tuesday, 10/21 In Class (tentative date)
Second Midterm	30%	Thursday, 11/20 In Class (date certain)

Problem Sets will be posted on Canvas with deadlines every 1-2 weeks. These problem sets will allow you to gain direct experience with the econometric techniques we cover. All assignments will be Stata-based, although they will require answering interpretation/"thinking" questions as well. One third of the problem set grade will be based on whether you complete the assignments and turn them in on time. I will also choose two assignments at random to grade in depth, and these grades will account for the remainder of your problem set grade. Note that the problem sets are fairly short and simple to start and become more difficult as we tackle more complicated material. You may work with other students on these assignments, and the code may be identical to other students' submissions. To eliminate the temptation to free ride, each student must submit his/her own copy of the problem set (via Canvas), and you should indicate each of your collaborators on each problem set.

Each student must answer the "thinking/interpretation" questions separately, although you may discuss the answers with other students. It is expressly forbidden to copy and paste answers to these questions from another student, and any evidence that this occurred will result in a penalty of, at a minimum, zero credit for that assignment. Using AI to re-word interpretation answers originally written by someone else is also expressly prohibited. Using AI to answer the interpretation questions is also not allowed. If you are thinking of using AI for the problem sets, note that the exams will ask very similar questions and will be closed-note paper-and-pencil exams. Doing your best on the interpretation questions without any assistance will best prepare you for the exams and for your future career as a researcher.

Paper Replication/Extension: Unlike the harder sciences, the field of economics has historically accorded relatively little value to replication papers (although this is changing somewhat). Nevertheless, empirical economists make mistakes (or even just questionable choices) all the time, and some of them go undiscovered forever. So, to practice the skills we are developing, and in service of the broader good, you will replicate the central analysis of a paper in a field that is of interest to you. You should choose a published paper that relies on publicly available data or on data that the authors have made available. The paper's central methodology should be one of the methods we cover in this course. You must also provide at least one extension to the original work. Possible extensions include additional years of data, running additional specifications (e.g. functional form, synthetic control instead of DiD, new method for staggered rollout, etc.), and subjecting the results to additional robustness checks. Alternatively, you could use similar methods in a slightly different context – different geography, different time period, etc. An existing paper is not suitable as a replication paper if you cannot feasibly extend the analysis. This assignment will function as our final exam, and an electronic copy of this paper will therefore be due on Canvas by the end of our assigned final exam time from the Registrar. A handout with more details on this assignment will be posted on Canvas.

I will submit all final papers to TurnItIn. Note that although this assignment requires the replication of the central analysis from a published paper, **you may not borrow any language from the original paper without proper citation. You may also not use AI to re-word language that part of the original paper.** I will require that you complete and attach the department's academic integrity cover sheet for the assignment.

https://www.colorado.edu/economics/sites/default/files/attached-files/academicintegrityagreement.pdf

The First Midterm will cover material from the beginning of the course through lecture on October 14. The exam will take place during a normal class meeting and is tentatively scheduled for October 21. You *will not* have to do any STATA programming for the midterm. Instead, the questions will focus on the interpretation and implementation of techniques we have discussed. The questions will thus be very similar to the interpretation questions asked on the problem sets. You may also be asked questions about the papers that we read.

The Second Midterm will be nominally cumulative, but it will focus heavily on material covered after the first midterm. It will be similar in format to the first midterm, and it will take place during our normal lecture time in the last class meeting of the second-to-last week of classes.

Final Letter Grades will be a weighted average of each of the components listed above. Prior to averaging, I will assign letter grades to each component based on the scores a good student at this level could reasonably be expected to attain.

Writing: Please note that this course requires a great deal of writing. The goal of the course is to prepare you to conduct and *to communicate about* original research using applied microeconomics. As you will soon find, the writing and communication components of applied econometrics are at least as important as the actual econometric skills. In grading papers, exams, and problem sets, I place substantial weight on students' ability to convey their understanding and interpretation of the methodologies and results. I do so to mirror the degree to which the discipline rewards these skills, especially in the job market process.

Seminar Series: You are strongly encouraged to attend the Economics department seminar series, especially when the speaker presents on an empirical applied micro topic. Learning to conduct and present original research is the key to your success in the discipline. These seminars are an excellent resource for you in that endeavor. You are also strongly encouraged to attend the applied micro brown bag series where students will present ongoing research that often uses the techniques we will be discussing.

Late Assignments/ Missed Examinations Policy: Problem Sets will be turned in through the Canvas website where they will receive a time stamp. Problem sets will be posted at least 10 days in advance, and each will be due on a Friday by midnight. By default, I will assign zero credit toward the "completion" component of the Problem Set grade for any assignment not turned in on time, but I am willing to offer extensions in many circumstances. If a student has not turned in a problem set before the last day of class and it is randomly chosen to be graded in detail, the student will receive zero credit toward the graded part of the assignment.

The paper replication must be turned in by the end of our assigned Final Exam time from the registrar. Failure to turn it in on time will result in a grade penalty.

There will be no make-up exams. If you have a conflict with a scheduled exam, please discuss the conflict with me as soon as possible. If you are unable to take an exam as scheduled, the missed exam will be given no weight in the calculation of the final grade and other assignments will be reweighted accordingly.

A note on my role: I am willing to help with any assignment for this course, including the final paper. I will strongly suggest, however, that you form study groups for the problem sets and use the other members of your group as your initial resource in solving programming problems. Suggested solutions will be provided shortly after the deadline to turn in the assignment.

Unfortunately, I cannot offer individual methodological help to every student who takes this course on research projects that are not a part of this course. If I become an official member of your dissertation committee, however, I will be happy to meet with you and discuss your dissertation research. I have availability to serve in this role for a few students in each cohort, primarily based on whether my research interests are a good match for the student's work. In addition, I regularly attend the department's applied micro brownbag and provide feedback to students who present there, regardless of whether I am on their committee. That said, my goal in offering this course is to create a critical mass of well-trained graduate students who can then continue to learn more on their own serve as a resource to each other.

Cheating: If you copy interpretation answers from a classmate (or previous student) on a problem set, you will receive no credit for that problem set. This penalty will also apply to answers that have been written or re-worded by AI. If you cheat on an exam, you will fail that exam. If you plagiarize even a portion of your final project, you will, at a minimum receive no credit for the copied portion. More than one past student has copied text directly from the paper they are replicating for the final project; if you do this (or if you or an AI only slightly rewrites the original text), you will receive no credit for that portion of your work. I reserve the right to impose harsher academic sanctions up to and including failing the course for any instance of cheating. Also, note that failing any component of the course makes it very unlikely that you will earn a "B-" or better in the course.

Tentative Schedule

Topic	Tentative Dates
Introduction and STATA Basics	8/21, 8/26
STATA Basics, incl. problem set instructions	8/26
Linear Regression Review	
Functional Forms – Logs, Polynomials, Categorical Variables, Interaction Models	9/2, 9/4
Review of FWL and the meaning of "controlling for"	9/9
The Experimental Ideal	
Treatment Effects – Potential Outcomes Framework	9/11, 9/16-paper
Causality in an OLS Regression – the CIA	9/18
Propensity Score Methods	9/23
Panel Data Models	
Advanced Data Management	9/25
Difference-in-Differences style designs with a single treatment time, incl. Event Study and Synthetic control	9/30, 10/2 - paper 10/7, 10/14 – paper
No Class – Reading Day	10/9
Staggered Adoption Methods	10/16, 10/30 –paper
First Midterm Exam	10/21
No Large Class – Sub Individual Meetings	10/23, 10/28
Fixed Effects and First Differences	11/4
Variance Estimation	11/6
Instrumental Variables	
Basics – Constant Treatment Effects	11/11
Local Average Treatment Effects	11/13, 11/18 – paper
Second Midterm Exam	11/20
No Class – Fall Break	11/25, 11/27
Regression Discontinuity	12/2, 12/4 – paper
Final Exam slot (Replication paper due)	Thursday, 12/11 1:00 PM

Additional Policies: This course is governed by additional policies that apply to all courses at CU Boulder. They are listed below for your reference, along with some specific information on how these policies will be applied in this course.

Honor Code

All students enrolled in a University of Colorado Boulder course are responsible for knowing and adhering to the Honor Code. Violations of the Honor Code may include but are not limited to: plagiarism (including use of paper writing services or technology [such as essay bots]), cheating, fabrication, lying, bribery, threat, unauthorized access to academic materials, clicker fraud, submitting the same or similar work in more than one course without permission from all course instructors involved, and aiding academic dishonesty. Understanding the course's syllabus is a vital part of adhering to the Honor Code.
All incidents of academic misconduct will be reported to Student Conduct & Conflict Resolution: StudentConduct@colorado.edu. Students found responsible for violating the Honor Code will be assigned resolution outcomes from Student Conduct & Conflict Resolution and will be subject to academic sanctions from the faculty member. Visit Honor Code for more information on the academic integrity policy.

Accommodation for Disabilities, Temporary Medical Conditions, and Medical Isolation

If you qualify for accommodations because of a disability, please submit your accommodation letter from Disability Services to your faculty member in a timely manner so that your needs can be addressed. Disability Services determines accommodations based on documented disabilities in the academic environment. Information on requesting accommodations is located on the Disability Services website. Contact Disability Services at 303-492-8671 or DSinfo@colorado.edu for further assistance. If you have a temporary medical condition, see Temporary Medical Conditions on the Disability Services website.

If you have a temporary illness, injury or required medical isolation for which you require adjustment, please let me know as soon as possible how I can help. I do not need to know the specific nature of your disability in order to discuss accommodation.

Accommodation for Religious Obligations

Campus policy requires faculty to provide reasonable accommodations for students who, because of religious obligations, have conflicts with scheduled exams, assignments, or required attendance. Please communicate the need for a religious accommodation in a timely manner. In this class, let me know as soon as possible if you foresee a conflict, and I will accommodate your absence to the best of my ability. See the campus policy regarding religious observances for full details.

Preferred Student Names and Pronouns

CU Boulder recognizes that students' legal information does not always align with how they identify. If you wish to have your preferred name (rather than your legal name) and/or your preferred pronouns appear on your instructors' class rosters and in Canvas, visit the Registrar's website for instructions on how to change your personal information in university systems.

Classroom Behavior

Students and faculty are responsible for maintaining an appropriate learning environment in all instructional settings, whether in person, remote, or online. Failure to adhere to such behavioral standards may be subject to discipline. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with race, color, national origin, sex, pregnancy, age, disability, creed, religion, sexual orientation, gender identity, gender expression, veteran status, marital status, political affiliation, or political philosophy.

Additional classroom behavior information

- Student Classroom and Course-Related Behavior Policy.
- Student Code of Conduct.
- Office of Institutional Equity and Compliance.
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Sexual Misconduct, Discrimination, Harassment and/or Related Retaliation

CU Boulder is committed to fostering an inclusive and welcoming learning, working, and living environment. University policy prohibits protected-class discrimination and harassment, sexual misconduct (harassment, exploitation, and assault), intimate partner abuse (dating or domestic violence), stalking, and related retaliation by or against members of our community on- and off-campus. The Office of Institutional Equity and Compliance (OIEC) addresses these concerns, and individuals who have been subjected to misconduct can contact OIEC at 303-492-2127 or email OIEC@colorado.edu. Information about university policies, reporting options, and OIEC support resources including confidential services can be found on the OIEC website.
Please know that faculty and graduate instructors are required to inform OIEC when they are made aware of incidents related to these concerns regardless of when or where something occurred. This is to ensure the person impacted receives outreach from OIEC about resolution options and support resources. To learn more about reporting and support a variety of concerns, visit the Don't Ignore It page.

Mental Health and Wellness:

The University of Colorado Boulder is committed to the well-being of all students. If you are struggling with personal stressors, mental health or substance use concerns that are impacting

academic or daily life, please contact Counseling and Psychiatric Services (CAPS), located in C4C, or call (303) 492-2277, 24/7.

Acceptable Use of AI in This Class

As discussed above, you may not use AI to reword anything that has been written by someone else and turn it in as if it is your own work. Asking AI for help with grammar, spelling, and/or style after initially drafting the final replication report is acceptable. Prompts such as “I have written this draft, but I am not a native English speaker. Can you please proofread it?” are acceptable.